

1 OUTDOOR DOME

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3 This application claims the benefit of provisional application  
4 Serial No. 60/221,399 filed July 28, 2000.  
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6 FIELD OF THE INVENTION

7 This invention relates to indoor/outdoor surveillance  
8 equipment and systems, and more particularly, to an improved camera  
9 assembly that has a housing that includes a hemispherical window or  
10 dome.

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12 BACKGROUND OF THE INVENTION

13 Closed-circuit surveillance equipment is well established and  
14 can include fixed-position cameras and zoom lenses mounted on pan  
15 and tilt mechanisms that are typically controlled by security  
16 personnel. In outdoor locations, an enclosure for the camera  
17 housing is usually employed and domed housing for such cameras are  
18 desirable due to their appearance as well as the fact that the  
19 camera itself is not easily visible, though the camera can scan a  
20 wide area. Typically, the dome itself will be painted or tinted to  
21 be opaque except for a limited area or window through which the  
22 camera can see the outside surroundings.

1 In a typical outdoor camera enclosure, a single main housing  
2 part is utilized, wherein a top thereof is connected to a pipe.  
3 Electrical connections are generally routed from a main power  
4 source through the pipe and into the housing. In addition, a  
5 hemispheric dome and additional internal components, such as the  
6 camera power supply, camera body, lens, pan & tilt mechanism, and  
7 controller electronics, are removably attached to an inside of the  
8 single housing part. Such camera assemblies are subject to damage  
9 and require means to protect the camera from moisture and  
10 precipitation, extremes in temperature, and unauthorized tampering.  
11 For example, some conventional housings permit rainwater or other  
12 moisture to accumulate and run down the conical side of the housing  
13 and onto the dome itself. There are however, many security domes  
14 housings that have a rating of IPGS and NEMA4 which means, among  
15 other things, that these units protect the internal electronic  
16 components from water and dust damage. To our knowledge, these  
17 rated domes have no moving parts. Thus it is necessary to  
18 disassemble and remove the dome whenever it is necessary or desired  
19 to align the window with the camera.

#### 20 21 SUMMARY OF THE INVENTION

22 An object of the invention is to provide a camera assembly  
23 with a rotatable dome.

1 Another object of the invention is to provide a camera  
2 assembly with a rotatable dome and that also fulfill the criterion  
3 to qualify for IPGS and NEMA4 ratings.

4 Another object is to provide a camera assembly with a movable  
5 dome that protects against water and dust damage.

6 These and other objects of the invention are accomplished by a  
7 camera assembly having a housing which comprises a dome, preferably  
8 a substantially opaque dome with a transparent window, which dome  
9 can be rotated and moved. Preferably, the dome is made rotatable  
10 through the use of a seal, preferably a continuous, circumferential  
11 bi-level seal that is s-shaped in cross-section, said seal having a  
12 first level that defines and includes a first groove that contains  
13 and preferably envelopes a circumferential flange portion of a wall  
14 portion of said housing, and a second level that defines and  
15 includes a second groove that contains and preferably envelopes a  
16 circumferential flange portion of a wall of said dome, the dome  
17 being rotatable and movable in the first groove of the seal, and  
18 preferably, substantially fixed and immovable in the second groove.

#### 19 BRIEF DESCRIPTION OF THE DRAWINGS

20 Fig. 1 shows an external view of a first embodiment of a  
21 camera assembly of this invention;

22 Fig. 1B is a vertical cross-section of the embodiment  
23 illustrated in Fig. 1A taken along line A-A;

Fig. 2 is an enlarged sectional view of the dome of Figure 1;  
Fig. 3 is an enlarged view of a section X shown in Fig. 1B;  
and Fig. 4 is a top elevation view of the dome of Figure 1.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

With reference to Figs. 1A and 1B, there is illustrated a camera assembly 10 which comprises a mounting cap 140 attached to sidewalls 109, 126 which are in turn attached to an optical surface or dome 135 to form a camera housing 130 which surrounds a camera or lens component (including electronics) 150, all as is well known in the art.

If desired, the camera housing 130 may include an environmental shroud 190 which is effective to deflect heat energy, dissipate heat energy not reflected, protect the camera from water and/or other moisture, and enables a high level of heat dissipation even when the camera is operated in sunlight at high ambient temperature. According to a first embodiment of the invention illustrated in Fig. 1B, an environmental shroud 190 surrounds the camera housing 130 substantially completely and comprises a lower section 100 and an upper section 120. The lower section 100 of the shroud provides protection from radiant heat energy for the camera housing 130 and may include a coating on a surface thereof or the surface itself may be specified so that the emissivity is such that

1 it reflects or deflects most of the radiant heat energy from the  
2 sun or any other hot body. Suitable coatings may include polyester,  
3 polyurethane, epoxy, transparent metallized  
4 polycarbonate coatings, aluminum foil inside various transparent  
5 materials, cold rolled steel, powder coatings, etc.

6 The housing 130 comprises an upper portion 115 and a lower  
7 portion 110 that includes a sidewall 109. With reference to Fig. 2  
8 to 4, the optical surface or a substantially opaque dome 135 with a  
9 transparent window 136 and sidewalls 137 is movably attached to the  
10 housing sidewall 109 of lower housing portion 110 through the use  
11 of a seal S, preferably a continuous, circumferential bi-level seal  
12 that is S-shaped in cross-section, said seal having a first level 1  
13 that defines and includes a first groove 2 that contains and  
14 preferably envelopes a circumferential flange portion 3 of a wall  
15 portion of said lower housing portion 110, and a second level 4  
16 that defines and includes a second groove 5 that contains and  
17 preferably envelopes a circumferential flange portion 6 of a wall  
18 137 of said dome 135, the dome being rotatable and movable in the  
19 first groove 2 of the seal S, and preferably, being substantially  
20 fixed and immovable in the second groove 5 of the seal.

21 The camera assemblies of the invention may be mounted as a  
22 pendant mount or as a wall mount as is known in the art. After the  
23 wall mount or pendant mount is established, the housing is opened

1 and the camera is mounted in the housing. Once the camera is  
2 mounted, it is aimed in the general area of the surveillance, and  
3 the housing is closed. The dome is covered from the inside to hide  
4 the camera. Once the housing is closed, in accordance with the  
5 invention, the dome may be rotated to position the viewing area of  
6 the dome to coincide with the position of the camera. In the past,  
7 disassembling the dome from the housing and reassembly would be  
8 necessary to make any adjustments in the position of the dome  
9 window 136 and the position of the camera 110 relative to each  
10 other.

11 Camera assemblies for outdoor use are tested to determine if  
12 they meet the industry standard IP65 rating. To meet this standard,  
13 a series of tests are conducted including a test wherein the  
14 assembly is sprayed with pressurized water and dust over a period  
15 of time. Assemblies that do not meet the criterion of this test  
16 cannot be rated for outdoor use. The camera assemblies of this  
17 invention have been found to be eminently qualified and readily  
18 meet this test.

19 While the invention has been described for convenience, in the  
20 context of outdoor surveillance cameras, it will be understood that  
21 the invention is not limited to these embodiments. The camera  
22 assemblies of the invention may be used in any context where it is  
23 necessary to protect the contents of a housing from moisture and

1 heat or dust, for example enclosed lighting, electronic equipment,  
2 other surveillance equipment such as switches, multiplexers, etc.  
3 Additionally, the invention may be embodied in other specific forms  
4 without departing from the spirit and scope or essential  
5 characteristics thereof, the present disclosed examples being only  
6 preferred embodiments thereof.

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